

See the testimonials at pages 16, 17, &c., of ALL, without exception, of the ship-builders in the city of New York—the best naval architects in the world—and the only place where this dock and the Balance dock are in operation together—preferring this plan to THAT and ALL OTHERS; also the concurrence of all the rest of the shipping interest of that city.

A
BRIEF SKETCH
OF THE
PLAN AND ADVANTAGES
OF
AN IMPROVED STONE DRY DOCK,
COMBINED WITH
A SECTIONAL
FLOATING DRY DOCK,
AND FORMING
A PERMANENT
STONE BASIN, PLATFORM,
LEVEL BEDWAYS, SLIDING WAYS, AND HOUSED SLIPS,
FOR REPAIRING, LAUNCHING, AND LAYING
UP IN ORDINARY, THE SHIPS OF THE
UNITED STATES NAVY.

NEW-YORK:
PRINTED BY P. MILLER, NO. 102 BROADWAY,
NEAR WALL STREET.

1845.

TAYLOR
LITH. COLL.

Miller P

1845

A
BRIEF SKETCH
OF THE
PLAN AND ADVANTAGES
OF A
SECTIONAL FLOATING DRY DOCK,
COMBINED WITH
A PERMANENT STONE BASIN AND PLATFORM,
AND CONNECTED WITH
LEVEL BEDWAYS, SLIDING WAYS, AND HOUSED SLIPS, FOR
REPAIRING, LAUNCHING, AND LAYING UP IN
ORDINARY, THE SHIPS OF THE
UNITED STATES NAVY.

NEW-YORK:
PRINTED BY P. MILLER, 102 BROADWAY, NEAR WALL STREET.
1845.

AA
4431
836

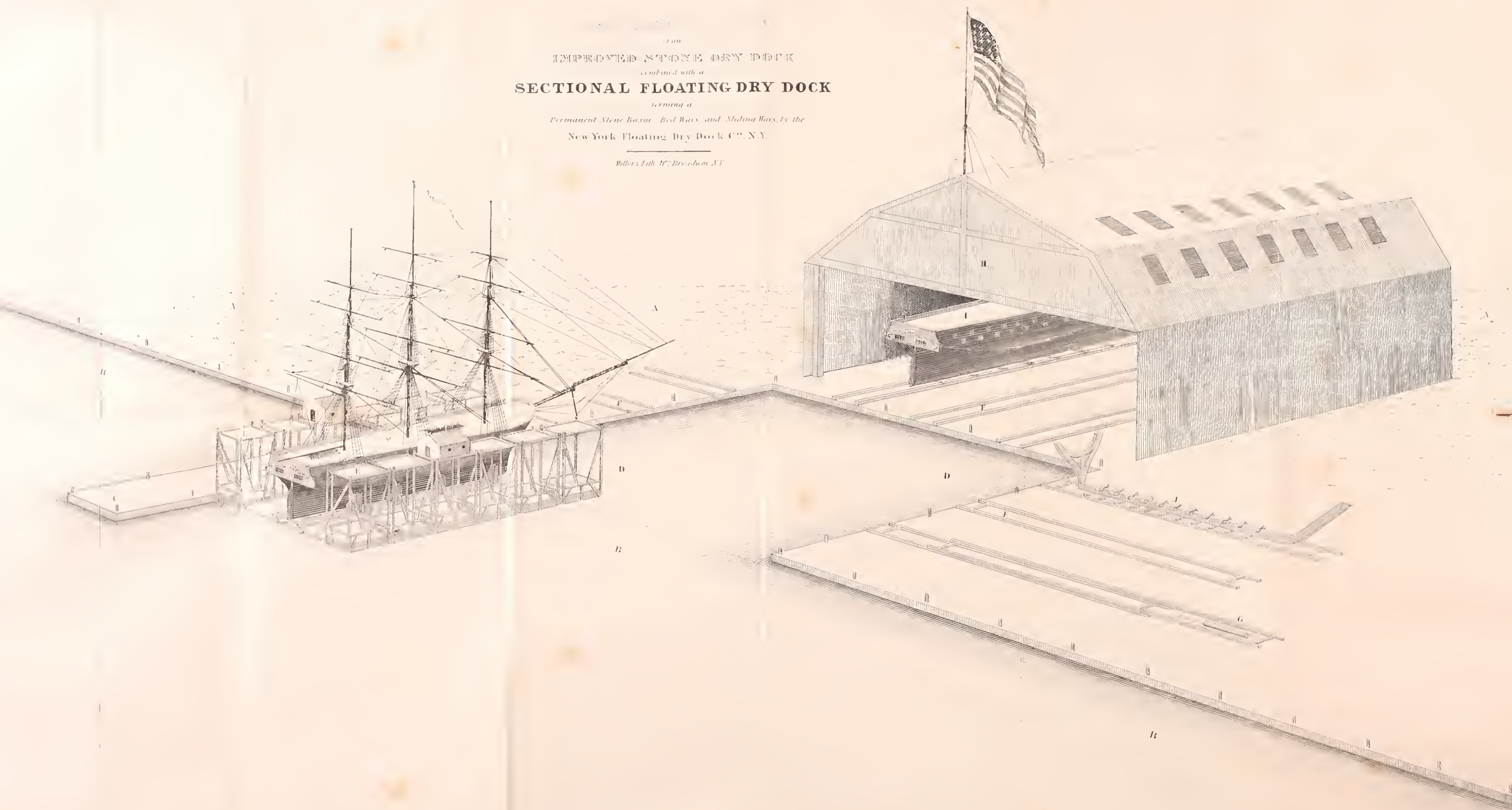
AVERY ARCHITECTURAL AND FINE ARTS LIBRARY

GIFT OF SEYMOUR B. DURST OLD YORK LIBRARY

OVL 3668 Box 91

IMPROVED SECTIONAL DOCK
combined with a
SECTIONAL FLOATING DRY DOCK
forming a
Permanent Stone Basin Bed Ways and Sliding Ways, by the
New York Floating Dry Dock Co., N.Y.

Mallet's Lith. J.C. Breckin A.F.



EXPLANATION OF THE PLATE.

- A. A. Represents a part of the Navy Yard.
- B. The Face Wall or Bulk Head of Navy Yard.
- C. A Pier extending out at right angles 175 feet.
- D. The Stone Basin and Platform 250 feet square.
- E. is the Sectional Dock with a ship elevated on it.
- F. F. F. is three Sett Ways on three sides of the Basin.
- G. is a Hydraulic Cylinder for drawing off a ship.
- H. A Ship House covering three sett ways.
- I. A ship drawn off the Docks on the ways.
- J. is the Keel of a new ship laid on the ways for building.



Digitized by the Internet Archive
in 2013

<http://archive.org/details/briefsketchofpla00daki>

SECTIONAL FLOATING DRY DOCK.

The Sectional Floating Dry Dock is a recent invention, for which several Patents have been issued. It has been in operation about five years in the City of New York, and has acquired the entire confidence of every Shipbuilder, Shipwright, and all persons engaged in Shipping or Steam Boats, who have had occasion to make use of it, and nearly all of whom have voluntarily come forward and signed certificates declaring its decided and unquestioned superiority over all other plans of Docks. During the time it has been in operation, about 1600 vessels, Ships and Steam Boats, have been raised and repaired upon it without the slightest accident either to the vessel or Dock, and it has given universal satisfaction both to the owners and shipwrights. Among the ships raised, have been the Steamship Great Britain, the largest Steamer in the world and of tonnage greater than a Ship of the Line, the Mexican War Steamers Montezuma and Gaudaloupe, the merchant ships Henry Clay, Queen of the West, John R. Skiddy, Ackbar, Thos. W. Perkins, Iowa, Queen Victoria, U. S. Sloop of War Vincennes, and numerous other first class ships, also the Steam Boats, Natchez, Diamond, Albany, North America, South America, Rhode Island, De Witt Clinton, Utica, Mohegan, Knickerbocker, Troy, Massachusetts and many others, all with the most perfect ease, safety and satisfaction to their owners.

A recent improvement has been made in the manner of using this Dock by uniting or combining it with a per-

manent Stone Basin, connected with Bed and Sliding Ways with a view of adapting it to the service of the Navy, for the purpose of repairing, rebuilding or laying up in ordinary, vessels of War, which in the opinion of Mechanics and Engineers competent to judge, renders it superior and much more efficient and convenient than the excavated Stone Dock, or any other plan known. The mode of using the Dock will be hereafter explained.

In Great Britain the want of some such plan for raising Ships and laying them up in ordinary, in Ship houses above the level of the water, has long been felt and acknowledged.

In order to provide for the protection of large ships, a great number of Granite Dry Docks have been built, at an enormous expense, (though much less than they would have cost in this country, owing to the great rise and fall of the tide there,) and such of them as are not required for building and repairs, are covered with roofs and used for laying up some of the ships-of-the-line, that are in ordinary, though the number is, as yet, inadequate to provide except for a small portion of them. The importance which is attached to this subject in that country, whose experience in naval matters, will be conceded by all to be worthy of profound consideration, is evinced by the following extracts from the *Encyclopedia Britannica*, vol. 8, pp. 77, &c.

“ Another very material improvement, recently introduced into His Majesty’s Dock Yards, is that of *covering the Dry Docks and Building Slips* with roofs. The rapid decay of our ships of war, by that species of disease known by the name of *dry rot*, attracted very general attention; its effects were well known, but a variety of opinions were entertained as to its causes and its cure. It was quite obvious, however, that exclusion of air and moisture, were the two great operating causes in giving activity to the progress of the disease, and that a ship in dock stripped of her planking, and open to the weather in every part, alternately exposed to frost, rain, wind and sunshine, must at least have her timbers differently affected, some swelled and water soaked, and others shrunk with heat, and others rifted with wind and frost; and if closed up with planking in this state, might be expected at no great distance of time, to exhibit symptoms of decay. The workmen, too, in the open Docks and Slips, suffered from the vicissitudes of the weather, no

less than the ships, and their labor was frequently suspended, to the great detriment of the naval service. The measure of roofing over the Docks and Slips, had long and repeatedly been suggested, but, either from prejudice or false economy, it was only very recently carried into practice, and is now almost universal in all the Yards. "

AGAIN: " These covers have been in use in Venice, from time immemorial, and Mr. Strange, the British Consul at that port, in 1792 says, that he saw twenty-two large ships laid up there under covered Slips, some of which had lain there for sixty years. "

AGAIN: " *The advantages which Slips are supposed to possess over Dry Docks, are many and important.* They can be constructed at one twentieth part of the expense; they occupy less space; they can be constructed on a steep or a shelving shore, and ships can be hauled upon them either in spring or neap tides; whereas a Dry Dock can only be made in particular situations, and when made, ships can only be docked and undocked, in certain states of the tides, from which circumstance considerable delay and inconvenience are frequently experienced. It should be recollected, however, that a large ship must necessarily go into a Dock preparatory to her being hauled out in the Slip. It has been considered not at all improbable, as was suggested sometime ago by Mr. Perring, *that the whole Ordinary may hereafter be laid on Slips, which, if housed over, would unquestionably be the best means of increasing their durability, and preserving them from partial decay. Nor is it certain that in the end, it would not be the most economical.* "

It will be seen that it is fully admitted in England, that many serious objections exist against the present system of Excavated Docks which were constructed at a time when no other method was known for taking ships out of the water. These defects we now propose to remedy in a great measure by the introduction of a new plan of Dock, Basin, Bed and Sliding Ways.

Similar views were entertained by President Jefferson, who in his Message to Congress, in December, 1802, says: " Presuming it will be deemed expedient to expend annually a convenient sum toward improving the Naval defence, which our situation may require, I cannot but recommend that the *first appropriations* for that purpose, *may go to the saving of what we already possess.* No care, no attention, can preserve vessels from rapid decay, which *lie in water and exposed to the sun.* These decays require great and constant repairs, and will consume, if continued, a great portion of the moneys destined to Naval purposes. To avoid this waste of our resources, it is proposed to add to our Navy Yard here, *a Dock, within*

which our present vessels may be laid up dry and under cover from the sun. Under these circumstances, experience proves that works of wood will remain scarcely at all affected by time. Similar depositories for laying up, as well as building and repairing vessels, may hereafter be undertaken at other Navy Yards."

The method of raising the ships to the requisite elevation, for protection in housed slips, on an inclined plane, in addition to the difficulty of applying the requisite mechanical force to accomplish it, is liable to the still more serious objection, that when they are to be let into the water again, they must be launched in the ordinary way. The evils and dangers attendant upon launching, are so serious, that ships of the first class are commonly constructed at present in Dry Docks, in England, and afterwards floated out by opening the flood gates.* In this country, the Board of Navy Commissioners have taken the same view of the subject, and recognised the injuries which result from launching ships of the first magnitude.†

It will therefore at once be admitted, that a plan, which will raise vessels from their floating level, wholly *above the surface* of the water, and deliver them *upon the surface* of the dry land, and which, with an efficiency almost unlimited, can raise one ship after another, till it delivers a whole fleet upon the shore, and is, at the same time, cheaper in its construction, more convenient, and better in its operation than any other known method, will render services to the naval marine of the highest importance, by preserving the maritime power of the nation in a state of efficiency, ready for active use, and saving continual outlays for the building of new ships to take the place of those that decay.

Such a plan is provided by the **SECTIONAL FLOAT-**

* Vide *Encyc. Brit.*, vol. 13, p. 55. † U. S. Navy Com. Report, to 19th Congress, (1826.)

ING DRY DOCK, used in connection with its permanent Platform, Basin, Bedways, and Housed Slips. It can be built with all its appurtenances, in one fifth part of the time usually required in erecting *one* stone dock, and at much less expense, and in point of efficiency for actual use, it is equivalent to a *number* of Stone Docks. Indeed, it may be said with truth, that *one* Dock upon this plan, is superior in all its respects to the whole combined system of *English Dry Docks*, for their naval establishment, which has cost them many millions of dollars.

It is unnecessary to give a written description of the Dock and working model, as the accompanying plan will explain its operation. It should however be stated, that the Dock is lowered, the ship to be raised is floated over the keel blocks, and the water is exhausted out of the Dock, which rises or floats above the level of the water with the ship upon it.

Having supposed the vessel elevated entirely *above the surface* of the water, upon a floating structure, which will draw about ten feet of water when thus raised, and capable of being easily moved with its burden in any required direction, let the reader imagine a basin large enough to turn the Dock around within it, excavated in the shore contiguous, with a permanent level platform of piles, concrete or masonry, constructed in its bottom, allowing the water to flow over it a sufficient depth, say ten feet. It will readily be perceived, that the Dock, with the vessel on it, may be floated into the basin, and allowed, by filling the tanks with water, to settle and rest upon the platform, which will afford a stable and permanent foundation, to sustain it beyond the reach of accidents. Let him suppose that a number of level bedways are laid upon the shore at right angles to any of the three sides of this basin; that the Dock, with the vessel on it, being easily turned around in the water, is made to settle

down in the direction of, and in connexion with, any one of these bedways, at the option of the superintendent ; that the bedway selected, is extended from the shore upon the top of the Dock, directly under the ship; that a cradle is made under the ship's bottom, to which sliding ways are firmly attached ; and that, by a mechanical power fixed upon the shore, or in any convenient manner, the vessel is hauled off from the Dock on a level, by the cradle, into a ship house on the solid earth, from which it may be delivered back again upon the Dock, at pleasure. The reader will then understand how one vessel after another, being first raised on the Sectional Floating Dock, is delivered and carried out upon the *surface* of the earth, or removed back again upon the top of the Dock, to be let down into the water.

In addition to the number of ships that could thus be delivered on the ways, at the same time, the Dock would be at liberty to raise and hold ships requiring temporary repairs, and is alone, independent of its connexion with the basin, platform, and bedways, far more efficient than a Stone Dock, as it can take two or more vessels upon it at the same time.

A more efficient, perfect, safe and easy manner of delivering ships out of the water can scarcely be conceived, and it is allowed by all practical mechanics, (whose experience gives their judgements a weight, which that of the mere theorist is not entitled to,) to be the best, most convenient and cheapest method ever before devised; obviating all the objections against both Floating and Stone Docks, combining the convenience of the light, flexibility, air, and room of the one, with the permanency and solidity of the other, and presenting a facility and efficiency for taking out a number of ships at the same time, and safely launching large ships or steamers, peculiar to itself alone, and hitherto wholly unknown.

By the aid of this Dock, not one ship alone, as in a Stone Dock, but a WHOLE FLEET, could, one after another at a small expense, be securely placed upon the stocks in a Navy Yard, or laid up in ordinary in ship houses where they would be perfectly protected against *dry rot* and every other source of decay. By its aid, the longest steamers and the heaviest ships of the line, could be safely launched without incurring the risk of straining, or hogging, or wrinkling their copper, while in Great Britain, vessels of this kind are usually constructed in Stone Docks to avoid this serious evil.

It is claimed that this plan of Dry Dock, is greatly superior to the Excavated Stone Dock and any other Dock whatever, for the following among other reasons, viz:

1. It presents a pliant, flexible, and yielding platform, capable of being made of any required strength by trussing, which conforms as soon as the vessel is brought to its bearing, to the shape of the keel and bottom; being upheld itself by the upward pressure of the water, more or less power being applied by each section, as required by the displacement of the ship.

2. It brings the vessel's bottom up fully into the light and air and affords a clear, broad, and well lighted platform from stem to stern, enabling the workmen to do their work from fifteen to twenty per cent. cheaper than on any other dock.

3. It is capable of extension, contraction, and division, adapting itself to the length of the vessel, and forming on the instant, two or more separate docks, each independent and perfect in itself; so that putting all the sections together, it is capable of raising the largest ship-of-the-line, or separating them into two or more berths, it can at the same time, take up two vessels of a smaller class, as a frigate and sloop-of-war; an advantage, which is of much moment when it is considered that the greatest portion of

vessels in the Navy are of the latter class, and which renders a Dock of this kind equal to two on any other plan; and when used in connexion with bed and sliding ways, its efficiency is increased immensely, and can be carried to any desired extent.

4. It is easily taken out of the water to be repaired, one section being raised on two others for that purpose; but other floating docks, though much more liable to get out of repair, in consequence of the immense strain on an inflexible platform, cannot be repaired without great difficulty even on a small scale, and *not at all on a large one.*

5. A Dock on this plan can be towed together or in sections from place to place, at a trifling cost, and in case of danger from the enemy, it could be sunk in deep water or removed to a place of safety, and after the danger is over, it could be raised and returned to its position.

6. The best test of the *simplicity* of all the machinery which has been devised and applied to obtain the above important results, is to be found in the fact, attested by the certificate of the Superintendent, who has worked the Dock ever since it was built, that no accident of any kind has ever occurred, either to the Dock or to any vessel, nor has the slightest injury happened to any part of the machinery.

On this Dock a ship is raised on a large, tight, dry platform *above the level of the water*, and held in exactly the same position as when afloat, in the most firm and secure manner, and presents, (in the language of an intelligent shipbuilder,) *a most perfect and convenient Ship Yard afloat.* Every part of a ship can be thoroughly examined, and lays as convenient for the mechanic to make his repairs, as if she was on the stocks in a ship yard, and it is admitted by shipwrights, that a ship can, from the convenient manner in which she lays, be repaired at least 15 or 20 per cent. less than in any other plan of Floating

or Dry Dock. It will readily be perceived that, in an Excavated Dock, the ship is ~~almost~~ entirely below the surface, in a very inconvenient position, and the mechanic has to make his repairs in a dark, damp, unwholesome place. As evidence of the convenience of this Dock, and the great facility and despatch it affords for raising, working and making repairs on ships, one simple fact may here be stated.

The steamboat KNICKERBOCKER, one of the longest in the world, being 306 feet in length, and 1000 tons burden, was raised, cleaned, and let down by this Dock, in seven hours, a despatch in docking unprecedented in this or any other country. Previous to raising this boat, a line of sights was placed across the deck, about ten feet apart from stem to stern, which has also been done with other long boats raised, and without, in any instance, being changed from a straight line in raising or lowering the boats and every door would open and shut without binding as freely as when the boat was afloat in the water, this is accomplished by exhausting more water from one than another section, to correspond with the displacement of the boat when afloat.

From two to three days is the usual time required for raising, stripping, caulking, recoppering and lowering into the water packet ships of the first class, a despatch attained by the short time required in Docking the Ship, and the facilities afforded the workmen.

It is presumed that the memorials and certificates annexed hereto, signed by *every shipbuilder* and all the *shipwrights* in the city of New-York, but two, (who are interested in other docks,) and by distinguished houses interested in shipping, together with the certificates of owners of steamboats and eminent civil engineers, will be *sufficient* to satisfy any unprejudiced and candid mind of the great superiority and utility of this Dock, and its pre-

eminent claims upon the attention of Congress. They are signed by men whose names, as eminent and skilful shipwrights, will be recognised by all with respect and pride. Among those who have signed the recommendations are MESSRS. WESTERVELT & MACKEY, the builders of the splendid Havre packets, and more lately of those models of beauty and skill, the *Ashburton*, *Prince Albert*, and *Victoria*; MESSRS. BROWN & BELL, known as the builders of the celebrated London packets, the Spanish Steamers, and *Queen of the West*; MESSRS. WEBB & ALLEN, builders of the well known Liverpool packets; MESSRS. SMITH & DIMON, builders of the splendid Knickerbocker steamboat, and a number of merchant ships; MESSRS. BISHOP & SIMONSON, also, JABEZ WILLIAMS, well known as extensive and skilful shipbuilders; WILLIAM H. BROWN, well known as the builder of the Russian steamer, *Kamschatka*, and the *Empire*; DIVINE BURTIS, builder of some of the North River steamboats; and HERBERT LAWRENCE, well known as the builder of a large number of L. I. Sound steamboats. MESSRS. WHITLOCK & BERRIEN, WEBB, ROBERTSON & Co., and BUCKNAM & CASILAER, are well known as very extensive shipwrights and of great practical experience in raising ships, and working upon all kinds of docks. The well known names of Jas. A. Stevens, Esq., Cornelius Vanderbilt, Esq., and J. Newton, Esq., will also be recognised as large steamboat owners, and men of great practical knowledge, and who have had a number of the largest class of steamers repaired upon this Dock. The opinion of all these experienced and practical shipbuilders and shipwrights, is entitled to great weight, and their character as such would not suffer by a comparison with that of any other class of naval architects, in this or any other country.

By the annexed certificates, it will be seen that most of the foregoing facts are strongly substantiated by a class

of men, who will at once be admitted to be the best judges of the subject, viz : the shipbuilders, shipwrights, and owners of ships and steamboats, who are thorough practical mechanics, or have a deep interest in the subject, and who have seen, tried, and thoroughly proved and tested this Dock, and who have been conversant with it from the time the first section was launched in 1840. As all the shipbuilders, shipwrights, and most of the shipowners in New-York have signed the certificates, it cannot be attributed to party influence or favour, but is a voluntary and significant tribute to the vast superiority of this Dock, by the whole shipping interest of New-York.

A statement is annexed in the appendix exhibiting the saving to the Government, by constructing a floating instead of a Stone Dock, and showing that economy is united with great improvement, and cheapness with superior merit.

APPENDIX.

(A.)

List of shipbuilders in the City of New-York, engaged in business at the present time :

WESTERVELT & MACKEY,
HERBERT LAWRENCE,
JABEZ WILLIAMS,
BROWN & BELL,
WEBB & ALLEN,
SMITH & DIMON,
BISHOP & SIMONSON,
DIVINE BURTIS & CO.,
WILLIAM H. BROWN.

List of shipwrights in the City of New-York, engaged in business at the present time :

WEBB, ROBERTSON, & CO.,
BUCKNAM & CASILAER,
WHITLOCK & BERRIEN,
IRVINE & CLARK,
PETER MACNAMARA,
FRANCIS SECOR & CO.,

We hereby certify, that the above are lists of leading and principal shipwrights and shipbuilders, engaged in business in the city of New-York at the present time.

(Signed)

GRINNELL, MINTURN, & CO.

The above list is introduced to show, that all the principal shipbuilders and shipwrights have signed certificates in favour of the Dock, and preferring it to any other plan of a dock.

(B.)

To the Senate and House of Representatives of the United States, in Congress assembled.

The memorial of the undersigned shipbuilders and shipwrights, resident and in business in the City of New-York, respectfully represents : that your memorialists are well acquainted with the several plans of Dry Docks for raising vessels for coppering and repairs : that among the several establishments for this purpose, at present in operation in this City, the one known as the Sectional Floating Dry Dock, at the foot of Rutgers-street, possesses by far the greatest elevating capacity : that we have repeatedly had vessels repaired upon it to our entire satisfaction : that we have no hesitation in declaring it in every respect a superior Dock, and most admirably adapted to accomplish the object for which it was constructed : that merchant ships of the largest class, have been raised upon

it in the most satisfactory manner, and that we entertain no doubt that the elevating power of this kind of Dock can be extended with perfect safety to a capacity of raising a line-of-battle ship: that its sectional arrangement gives the structure the ability to be extended to accommodate the largest steamers, and embrace their greatest width without endangering its strength, and from its flexible platform, enables it to conform to the shape of the vessel, and lift it equally upon its bottom, and endues it with the important advantage of being divisible into two separate Docks, to raise two vessels at a time, and perform the service of two independent Docks on any other plan: and that on these accounts and others, we prefer it to the plan of any other Floating Dock known to us. We, therefore, cheerfully recommend it to the Government, as a useful Dock for the service of the Navy; and your memorialists, as in duty bound, will ever pray, &c.

NEW-YORK, January 2, 1843.

WEBB, ROBERTSON, & CO., Shipwrights.
 C. & R. POILLON, do.
 BUCKNAM & CASILEAR, do.
 JNO. HARRISON, do.
 WESTERVELT & MACKEY, Shipbuilders.
 HERBERT LAWRENCE, do.
 WHITLOCK & BERRIEN, Shipwrights.
 DIVINE BURTIS & CO., Shipwrights and builders.
 BROWN & BELL, Shipbuilders.
 WEBB & ALLEN, do.
 WM. H. BROWN, do.
 DENIKE & KING, Shipwrights and sparmakers.
 BAYLES & BROWN, do. do.
 BISHOP & SIMONSON, Shipbuilders.
 IRWIN & CLARK, Shipwrights and builders.
 WM. RODMAN, Shipwright.
 C. EDGAR SMITH, Shipwright.
 GEO. A. SAUNDERS, do.
 ALLEN GORHAM, do.
 FICKET & THOMAS, Shipbuilders.

(C.)

To the Senate and House of Representatives of the United States.

The Memorial of the undersigned, ship owners and interested in shipping, resident and in business in the City of New-York, respectfully represents: That your memorialists are well acquainted with the several plans of Dry Docks, for raising vessels for coppering and repairs: that among the several establishments for this purpose, at present in operation in this City, the one known as the Sectional Floating Dry Dock, foot of Rutgers-street, E. R., possesses by far the greatest elevating capacity: that we have no hesitation in declaring it in every respect a superior Dock, and most admirably adapted to accomplish the object for which it was constructed: that merchant ships of the largest class

have been raised upon it in the most satisfactory manner, and that we entertain no doubt that the elevating power of this kind of Dock, can be extended with perfect safety to a capacity of raising a line-of battle ship : that it raises the vessel up more fully into the light and air, and affords the shipwright more room and better access to the vessel's bottom, than any other Dock ; that its sectional arrangement gives the structure the ability to be extended to accommodate the longest steamers, and embrace their greatest width, without endangering its strength ; and from its flexible platform, enables it to conform to the shape of the vessel and lift equally upon its bottom, and endues it with the important advantage of being divisible into two separate Docks, to raise two vessels at a time, and perform the service of two separate Docks on any other plan : that on these accounts and others, we prefer it to any other plan of Dry Dock that has come to our knowledge. We, therefore, cheerfully recommend it to the Government as a useful Dock for the service of the Navy, and your memorialists will ever pray, &c.

NEW-YORK, Dec. 29th, 1842.

GRINNELL, MINTURN, & CO., Agents and part owners of the new lines of London and Liverpool packet ships.

CHAS. M. MARSHALL, Agent and part owner of the Old line of Liverpool packets.

ROBERT KERMIT, Agent and part owner of the Old lines of Liverpool and London packets.

RICHARD IRVIN, Agent and part owner of the Great Western line of Atlantic steamers.

DUNHAM & DIMON, Agents and part owners of the New Orleans, Mobile and Charleston packets.

C. BOLTON, FOX, & LIVINGSTON, Agents and part owners of the Havre line of packet ships.

BARCLAY & LIVINGSTON, Agents of the Cunard line of Atlantic steamers.

GOODHUE & CO., Agents and part owners of the Old line Liverpool packets.

JOHN GRISWOLD, Agent and part owner of the London Old line of packets.

WOODHULL & MINTURN, Agents of the Liverpool line.

JOHN ELWELL & CO., Agents and part owners of the Mobile and New Orleans packets.

STURGES & CLEARMAN, Agents and part owners of the Savannah, Norfolk, and Mobile packets.

JOHN OGDEN, Agent and part owner of the Richmond and other Southern packets.

POST & PHILLIPS, Agents and part owners of the Apalachicola and other packets.

CENTER & CO., Agents and owners of Mobile packets.

JOHNSON & LOWDEN, Agents and owners of New Orleans packets.

SAMUEL THOMPSON, Agent and owner of Liverpool packets.

ABRAHAM BELL & CO., Agents of Transatlantic Steam Navigation CO.,

ROCHE, BROTHERS. & CO., Agents of Liverpool packets.
 JACOB HARVEY, President of Washington Marine Insurance Co.
 Z. COOK, Jr., President Mutual Safety Insurance Company.

GORDON & TALBOT,	Ship owners.
TAYLOR & MERRILL,	do.
S. E. GLOVER,	do.
WM. M. PECK,	do.
TALBOT, OLYPHANT. & CO.,	do.
CARY & CO.,	do.
BUCK & CO.,	do.
JOSIAH MACY & SONS.	do.
H. & J. B. MURRAY,	do.
A. G. & A. W. BENSON,	do.
PETER J. NEVIUS & SONS,	do.
DAVIS, BROOKS, & CO.,	do.
JOHN B. LASALA & CO.,	do.
J. FOULKE & SONS,	do.
HICKS & CO.,	do.
E. DUNSCOMB & BECKWITH,	do.
JOHN PETERS & CO.,	do.
ALLEN & PAXON,	do.
MOSES TAYLOR,	do.
PRATT & BURR,	do.
JONATHAN HILLMAN,	do.
P. J. FARNHAM & CO.,	do.
SLATE, GARDNER, & HOWLAND,	do.
J. & N. BRIGGS,	do.
DEPEYSTER & WHITMARSH,	do.
NEW YORK INSURANCE COMPANY,	
AMERICAN INSURANCE COMPANY,	
B. McEVERS,	Ship owner.
A. B. NEILSON,	do.
HOWES, GODFREY, & ROBINSON,	do.
PETER HARMONY'S NEPHEWS,	do.
R. P. BUCK,	do.
JAMES HENRY,	do.
RUSSELL & COPELAND,	do.
EVERETT & BATTELI E,	do.
BRETT & VOSE,	do.

AND MANY OTHERS.

(D.)

I hereby certify, that I had the large packet ship, "Ville de Lyon," taken out a short time since, on five of the seven sections of the Floating Dry Dock, foot of Rutgers street, E R., in a manner perfectly satisfactory. She was raised with great facility, without the least strain, the Dock conforming to the shape of the vessel, and lifting equally on all its parts, and was held in a perfectly easy manner while out of the water; remaining on during one of the severest storms experienced in this harbor, without the least strain or motion of the vessel or Dock; and I have no

hesitation in recommending this as a perfectly safe Dock; possessing the greatest elevating power within my knowledge, and affording greater facilities for making the repairs, having a broad, tight floor from stem to stern; unobstructed light and free access to the bottom of the vessel.

CHARLES STODDART,

New-York, Dec. 24, 1842.

Master of the Ville de Lyon.

We concur in the above statement of Captain Stoddart.

C. BOLTON, FOX, & LIVINGSTON,

Owners of the Ville de Lyon and Agents of the Havre packets.

December 30, 1842.

(E.)

New-York, Oct. 24, 1842.

The undersigned, interested in steamboats, and resident in the City of New-York, do hereby certify, that we are acquainted with the operation of the Sectional Floating Dry Dock, at the foot of Rutgers-street, in the East River; that we have had steamboats repaired thereon; that we unhesitatingly pronounce it the best plan of Dry Dock, that we know of, for taking up steamboats for repairs, and as such, we recommend it to the attention of the Navy Department, to be adopted for the use of the United States Navy.

JAMES A. STEVENS,
S. R. ROE,
R. B. COLEMAN,
A. H. SHULTZ,
ALEX^r McLEAN,
DANIEL DREW,
J. H. VANDERBILT,
JOSEPH J. COMSTOCK,

CORNELIUS VANDERBILT,
M. H. TRUESDELL,
L. U. BRAINARD,
J. NEWTON,
JOHN B. VAIL,
CURTIS PECK,
JOHN DUNLOP,
ANTHONY N. HOFFMAN.

(F.)

We, the undersigned, shipwrights, &c., resident and in business in the City of New-York, do hereby certify, that we have been for a long time engaged in the business of coppering and repairing vessels, and are well acquainted with the different plans of Dry Docks, used for that purpose; that we are familiar with the construction and operation of the Sectional Floating Dry Dock, foot of Rutgers-street, East River, and we have no hesitation in declaring it, in our opinion, the best plan of Dry Dock known to us; that the conveniences for shoring and staging; the broad tight floor from stem to stern; the perfect exposure of the vessel's bottom to the light and air; and the facilities for repairing or putting on a keel or shoe, by depressing into the water by means of screws, one section at a time, and giving the vessel an equally easy bearing on continuous ways on each side of the keel, which is left clear of the blocks

the entire length of the vessel, if necessary, enable the workmen to accomplish their labor from 15 to 20 per cent. cheaper in this than any Dry Dock, on any other plan.

WEBB, ROBERTSON, & CO., Shipwrights.
 DIVINE BURTIS & CO., Shipwrights and builders.
 BUCKNAM & CASILEAR, Shipwrights.
 IRVIN & CLARK, Shipwrights, caulkers, &c.
 WESTERVELT & MACKEY, Shipbuilders, &c.
 WHITLOCK & BERRIEN, Shipwrights.
 WEBB & ALLEN, Shipbuilders.
 BISHOP & SIMONSON, Shipbuilders.
 BROWN & BELL, Shipbuilders.
 DENIKE & KING, Shipwrights.
 GEORGE A. SAUNDERS, Shipwright.
 HERBERT LAWRENCE, Shipbuilder.
 BAYLES & BROWN, Shipwrights.
 C. & R. POILLON, Shipwrights.
 JOHN HARRISON, Shipwright.
 C. EDGAR SMITH, Shipwright.
 ALLEN GORHAM, Shipwright.

NEW-YORK, Jan. 4, 1843.

(G.)

LETTER FROM CAPTAIN GREGORY, U. S. NAVY.

U. S. REC. SHIP, NORTH CAROLINA.

New-York, Nov. 16, 1842.

Sir—Understanding that S. D. Dakin, Esq., President of the New-York Dry Dock Company, is about presenting himself to you for the purpose of laying before you, plans and proposals for building a Dock upon the same principles, for Naval purposes, upon this station; I beg leave most respectfully, to represent for your information, that having at various times, since the Floating Dock has been in operation, examined its construction, and witnessed the facility, safety, and despatch with which ships have been taken in and repaired, I am fully convinced of its superiority over all other kinds I have seen: and I have no hesitation in recommending it to your consideration, as being, in my opinion, the most safe, economical, and expeditious mode of constructing a Dry Dock; and that it can be constructed, so as to answer all the purposes required in a Naval Establishment.

I have the honor to be,

Very respectfully, your ob't serv't,

(Signed,)

F. H. GREGORY, Captain, U. S. N.

Hon. A. P. UPSHUR,

Secretary of the Navy, Washington.

(H.)

I hereby certify that I have been the Superintendent of the Sectional Floating Dry Dock since it was first put in operation, in December, 1840; that since that time, it has been in constant and successful operation, raising vessels of various sizes, from the smallest to the largest; that *upwards of* 1500 vessels have been taken up and repaired thereon, between that time and December, 1845, (about five years); that no accident of any kind has ever occurred, either to the Dock itself or to any vessel while being raised or repaired thereon, or let down into the water; nor has the slightest injury ever happened to any part of the machinery of the Dock.

PHINEAS BURGESS,

Superintendent of the Sectional Floating Dry Dock.

NEW-YORK, Dec. 1, 1845.

(I.)

OPINION OF THE AMERICAN INSTITUTE.

The American Institute last Spring appointed a Committee to examine this plan of Dry Dock, who made a long and able report; but we have room only for the following extract, which embraces the conclusion at which they arrived:

"In view of the qualities which a Floating Dry Dock possesses, for purposes to which a fixed arrangement would be inapplicable, such as its portability, its easy application in harbours where, from great depth of water or softness of bottom, other Docks could not be constructed, and also from the successful operation of this arrangement, its applicability to the ordinary purposes of a Dry Dock, your Committee feel assured of its extensive adoption, and cheerfully express their opinion of its superiority over any other Floating Dry Dock, or work of this description, which has come to their knowledge.

June 19, 1842.

T. B. STILLMAN, Chairman."

(J.)

OPINION OF FOSTER RHODES, Esq.,

Naval Constructor at Brooklyn, and late Chief Naval Constructor to the Grand Seigneur, and builder of the Stone Dry Dock at Constantinople, contained in a long and able letter to Mr. Dakin, last Spring, from which the following is a short extract:

"The structure which you have built, consisting of seven sections, is capable of raising vessels of greater size than any Elevating Dry Dock I have yet seen. This power is, in my opinion, capable of increase to to a very considerable extent, without detriment to its operations, and is exerted in such a manner upon the vessel, as to hold her in position out of the water, by a pressure similar to that which sustains her when afloat, thus affording the best possible security against any strain or injury.

"In your Dock, the sections fit as it were, to the vessel's keel and bottom, and conform, while they lift, to its floating shape, pressing harder or lighter at each point, as it may require more or less support. Many

other advantages might be named, such as better light, and more room for the shipwright, and greater conveniences in shoring than on any other Dock ; and also ability of being removed from one location to another, and independence of the tides, unknown to other Docks. I would not be understood as attempting to specify in detail, the advantages of your plan of Dry Dock, but merely to allude to a few of the most prominent ones.

"I would also remark, that your plan is the cheapest method, at least hitherto devised, of bringing the requisite power to bear in the right way for raising vessels, for repairing and coppering : and I can hardly conceive how any thing cheaper could be invented, than yours, if constructed with economy and mechanical skill.

"I assure you I shall have no hesitation, if called upon for an opinion, to recommend to the United States Government, to construct a Floating Dry Dock upon your plan, forthwith, for the use of the Navy. The reasons which I should give are, that great breadth, so much required for steamers, is an advantage to the stability of this Dock, and the facility of extending its length to the extreme of steamships ; *second*, its cheapness ; and *third*, the short time it would require to erect and put one in efficient operation. A Dry Dock on your plan can be built in a few months, whereas it will take some years to complete the Excavated Dry Dock, now begun at this yard.

"The premises of the United States, at this place, are well adapted to receiving a Dock on your plan as any requisite depth of water can be easily procured at a trifling expense with a dredging machine. "

"The Naval service demands a Dry Dock at New-York, without delay. The efficiency and advantages of yours, induce me to say, unhesitatingly, that the subject of building one for the use of the Navy, is entitled, in my opinion, to the immediate attention of the Government. "

(K.)

Extract from the Report of a Select Committee of the Common Council of the City of New-York, on the subject of a Dry Dock, to raise the U. S. Ship of the Line FRANKLIN, adopted unanimously on the 12th day of June, 1843.

"In case this plan should fail, (which is not at all probable, in the opinion of your Committee,) there is a Sectional Floating Dry Dock in this port, at the foot of Rutgers-street, East River, capable of raising so large and heavy a mass. This is the same Dock which took up the U. S. Ship Vincennes, last summer to the great satisfaction of the Government which has raised repeatedly the largest class of merchant ships, on five only of the seven sections composing the Dock, and is certified by a large number of shipping merchants and shipwrights, to be decidedly the best plan of any Dry Dock hitherto devised.

This Dock is of the elevating kind—raises the vessel entirely above the surface of the water, exposes her bottom fully to the light and air, affords ample room around her hull for the workmen, and holds her in a gentle and easy manner, secure against any strain or danger of any kind. Its clear lifting capacity is stated to be about 2,000 tons, and its power available for raising the Franklin, would be about 1,700 tons.

It is evident, therefore that when the ship is cut down to a razee, and her weight reduced to 1,200 tons or thereabouts, this Dock can easily raise her high and dry above the water; but as she would have to be out of the water many months, and this Dock could not properly be withdrawn from the commercial marine for so long a time, your Committee proposed to inquire what arrangements could be adopted to secure this essential object. A plan has been submitted to your Committee, which strikes them not only as feasible, but as presenting a far better method of accomplishing this purpose than an Excavated Stone Dock, or any other known process can afford. The plan is as follows: a strong cradle could be constructed under her bottom, and securely bolted to the ship. To the bottom of this cradle, two sliding ways, (exactly to conform to the permanent launching ways from the ship-house,) could be attached. After this was completed, the ship could then be let down, and by means of powerful crabs and windlasses, aided by blocks and pulls, could, without any difficulty, be hauled upon the permanent launching ways running out from the ship-house, the ends of which are about twelve feet under water, at high water mark. It may be proper to add, that this plan of taking out the ship, emanated from one of the most distinguished Naval architects in the country; and there can be no doubt of its complete success. Should the Navy Department have any doubts of the practicability of this plan, there would be no difficulty in obtaining responsible contractors to undertake to do the work.

After having hauled the ship into the ship-house, the advantage of repairing her under cover in a dry, light, airy ship-house, where the work could be done at leisure, would be obvious, while in a Dry Dock, the work would have to be performed at perhaps a disadvantage, and the ship would not be in as favorable a position for re-building, as the labor would have to be done in a cramped space, without light and air to dry the ship; and it has been estimated that the ship can be repaired at a cost of \$20,000 less in a ship-house, than in a Stone Dock or any other Dry Dock, and would be worth from \$20,000 to \$30,000 more when completed."

(L.)

The undersigned, Port Wardens of the City of New-York, being by their occupation brought in contact with shipwrights, ship owners, and Dry Docks, and being well acquainted with the various plans of Dry Docks in use in this City, and with public opinion in relation thereto, do hereby certify, that we unhesitatingly declare, the Sectional Floating Dry Dock, in our opinion, to be far the best plan that has come to our knowledge, and that such is the opinion of all disinterested persons competent to judge throughout the community. It raises the vessel in the most easy, safe, cheap, and expeditious manner, affording better facilities for shoring and seaming the vessel than any other plan of Dock known to us, holding the vessel in the most convenient position possible for making repairs, and, in our opinion, admirably adapted to the use of the Navy, affording the most convenient and effective Dock, for comparatively small cost.

We are well acquainted with the Balance Floating Dock, which is in use here on a small scale. Plans, nearly the same, have been in use for

many years, and we consider it, in every way, inferior to the Sectional Floating Dock, in plan, and every other important respect, possessing less conveniences, light, air, and room for the workmen, being less safe for the vessel, and less secure against injury to its own structure, and having much less efficiency for practical purposes.

With the facilities which we have to enable us to form a correct judgment on the subject, we have no hesitation in recommending the Sectional Floating Dock to the Government, for the use of their Navy.

(Signed.)

WILLIAM TYACHE,
HARRY PARSENS,
ANTHONY MOFFAT,
WILLIAM NEWCOMB,
R. H. TITTLE.

NEW-YORK, 30th June, 1843.

(M.)

We, the undersigned, *Civil Engineers, Shipbuilders, Shipwrights, and Ship owners*, being familiar with the construction and operation of the Sectional Floating Dry Dock now in use at the foot of Pike street, E. R., in this city, on a large scale, and having carefully examined a small dock on the same plan, worked in a permanent basin, constructed for its reception, connected with level bed and sliding ways for hauling ships into the yard, state, as the result of our examination, that by this combined arrangement, the dock raises the ship out of the water, and is floated with the ship upon it, into the shallow basin, and settles upon the platform, by admitting water into the tanks, when the ship may be repaired on the dock, or by means of a hydraulic cylinder, or other power hauled off on the permanent ways into a ship house; and when repaired and required for service, may, by the same power, be placed again on the Dock, floated out of the basin, and lowered into the water. By constructing the basin as designed, of sufficient size to admit of the dock being turned around therein, room is afforded to lay three sets of ways on each of the three sides, extending into the yard, on which nine ships may be placed at the same time, for repairs, re-building, or laying up in ordinary; furnishing facilities equal to nine separate stone or excavated docks, at the same time leaving the dock at liberty for temporary repairs. This plan furnishes also building slips for new ships and steamers with facilities for placing them in the water without incurring the risk of straining or hogging them in launching by the usual way. Ships are also placed by this method in a much more convenient position for being repaired or re-built, than in an excavated wall dock; the workman having the advantage of abundant air, light, and room.

We cheerfully express our entire confidence in the utility, convenience, simplicity, and perfect safety of this plan, and do not hesitate to recommend it to the Government for the use of the Navy, as in our judgment superior to an excavated stone, or any other plan of Dock known to us.

WESTERVELT & MACKEY, Shipbuilders.
JAZEB WILLIAMS, do.

BROWN & BELL, do.
 WM. WEBB, Shipbuilder, late firm of Webb & Allen.
 DIVINE BURTIS & CO., Shipbuilders.
 HAYTHORN & SEERS, do.
 BISHOP & SIMONSON, do.
 WEBB, ROBERTSON, & CO., Shipwrights.
 BUCKMAN & CASILEAR, do.
 WHITLOCK & BERRIAN, do.
 BAYLES & BROWN, do.
 WILLIAM BENNET, do.
 CORNELIUS VANDERBILT, Steamboat Proprietor.
 HORATIO ALLEN, late Chief Engineer of the New York
 Croton Aqueduct Department.
 T. S. BROWN, Chief Engineer, N. Y. & E. R. R.
 T. B. STILLMAN, Civil Engineer.
 PAUL R. HODGE, do.
 GEO. S. SCUYLER, do.
 EDWARD MARTIN, do.
 CALVIN POLLARD, do.
 GAMIEL KING, do.
 ASA STEBBINS, do.
 THOS. HASSARD, do.
 ARNOLD MASON, } Contractors High Bridge for
 SAMUEL ROBERTS, } Croton Aqueduct.

And many others not procured in time to be put in print.

New-York, Dec. 23, 1843.

(N.)

We hereby certify, that we have had large Steam Boats raised upon the Sectional Floating Dry Dock at the foot of Pike street, and understand the manner of the construction and operation, and also examined a Dock upon a small scale upon this plan, constructed with a permanent Basin, and Bed, and Sliding Ways for the purpose of hauling ships off the Dock and have no hesitation in stating, that in our opinion, this Dock connected with the Stone Basin and Bed Ways, is superior to the excavated Stone Dock or any other plan of Floating Dock known to us for Naval purposes.

SMITH & DIMON,
Shipbuilders.

New-York, Jan. 1st, 1844.

☞ The original documents of which the foregoing are copies, are all in possession of the Secretary of the Navy.

(O.)

The expense of a Dock of six Sections, of a combined power sufficient to raise the largest ship-of-the-line, and of a permanent Stone Basin two hundred and fifty feet square, constructed in as durable manner

as an Excavated Stone Dry Dock, together with three Bed and Sliding Ways, laid upon a foundation of piles, cut off at low water, and worked up therefrom with stone masonry, covered with a Ship-house two hundred and fifty feet square, would not exceed ONE-HALF of the cost of an old-fashioned Excavated Stone Dock, at the Brooklyn Yard. A small additional expense would increase the bed or railways to NINE in number, with ship-houses over all, connected with one basin of the above size; and by extending the basin in length, two new railways could be made for every eighty feet, and so on to an unlimited extent. EACH ONE of these bedways, upon which the same Dock may deliver any number of ships, is in fact far better in all respects, and holds the vessels in a far more favorable position than an Excavated Granite Dock on the old plan. The basin and bedways would be as permanent and durable as the Granite Dock, and the most expensive part of the Floating Dock being constantly saturated with salt water, would be nearly imperishable. The parts of the structure that would be perishable at all, would last for a whole generation, at least, and are readily renewed, as they decay, to the permanent parts; and the whole could be replaced, if required, for the interest of the cost of one Stone Dock, every four or five years.

The cost of the single Stone Dock at Norfolk was \$974,000
 The interest lost for several years, while the Dock
 was building, and before it could be used,
 would bring the cost up to about \$1,200,000

New-York, January 1st, 1844.

(P.)

LETTER FROM H. M. SHRIEVE, ESQ., INVENTOR OF THE SNAG-BOAT, &c.

WASHINGTON, May 20, 1844.

Dear Sir—I have the honor to acknowledge the receipt of your letter of the 18th inst., asking my opinion of the practicability and utility of the Sectional Floating Dry Dock Basin and Railways, for the use of the Navy, a model of which is now exhibiting by Messrs. Dakin & Moody, at the Capitol.

In reply, I have to state, that I have examined the model at the Capitol, in all the various operations of raising ships, and hauling them off on the Railways, and have come to the following conclusion :

First, That the ship is taken up and placed upon the Railway, and again removed to a floating position, almost without the possibility of injury to the vessel.

Secondly, That when the ship is on the Railway she is in the open air, where the bottom will dry, and be in a condition to receive the necessary repairs in a much shorter time than if placed in the Ordinary Dry Dock. The workmen will also have the advantage of the open air, instead of being confined in a damp enclosure. Again, there will be a vast saving of labor in favor of a Railway in removing the timber, and other materials, to and from the ship undergoing repairs; for instance, the ship is placed in a dock surrounded by a wall, or in a box of a float-

ing Dry Dock ; it cannot then be approached without passing over the inclosure ; whereas, the ship on the Railway has no obstructions to prevent a free access from every side. From these, and other important considerations, I have no hesitation in giving my opinion decidedly in favor of the Sectional Floating Dry Dock Railway and Basin, over all others I have examined, or had any knowledge of, as being the safest in its operation, and much the most economical both for repairing and building vessels of all classes.

Very respectfully,

Your ob't servant,

HENRY M. SHRIEVE.

Hon. E. J. BLACK,

House of Representatives, Washington.

(Q.)

TO THE PUBLIC.

OFFICE OF THE NEW-YORK FLOATING DRY DOCK CO., }
New-York, Oct. 25th, 1845. }

As a number of contradictory statements have been made by individuals, and the public press of this city, relative to the raising of the Great Britain upon the Sectional Dock, the Company deem it due to themselves and the public, to give a correct account of her being docked, and the reasons for not elevating her entirely above the water, as many may suppose that the dock was incapable of lifting her.

On the day of her arrival at this port, Captain Hosken and Mr. Irvin called at the office of the Dock and contracted with the company to raise the ship eight feet, for the purpose of repairing her propeller. We, however, supposed that we should be allowed to raise her entirely above the water, if it should be found that we had the necessary power.

After her cargo had been discharged, she left the pier where she was moored, about 11 o'clock, A. M., and by half past 12 was placed over the dock, centered, the bilge blocks adjusted, and the pumps put into motion. They were kept to work until about 2 o'clock, having then raised her $7\frac{1}{2}$ feet, when we were informed by the commander, Captain Hosken, that, as the shaft of her propeller was above the water, she was raised sufficiently for his purpose ; that we had performed our part of the contract, and that he did not wish, and would not allow us to raise her any higher. We therefore stopped our pumps, and immediately a number of workmen were engaged at her propeller. Thus it took but three hours from the time she left her berth to the time the mechanics commenced their repairs upon the propeller.

The register of the Great Britain in England is 3443 tons. Her displacement of water, or weight light, is about 2300 tons gross, and in raising her $7\frac{1}{2}$ or 8 feet, we had lifted about 1700 tons, leaving but 6 or 700 to be raised to elevate her entirely above the water.

We have in our dock 8 sections, 7 of which have a clear lifting capacity of 300 tons each, and one of 450 tons, making 2550 tons over and above the weight of the part of the dock above water ; and to obtain this

power it would be necessary to immerse but a small portion of the end floats. This power is obtained by exhausting water from immense tanks placed in strong truss frames, beneath the ship. The weight of the ship is sustained by these frames, and does not bear upon the machinery at all, except in a very small degree when we immerse the end floats.

Upon sounding our tanks, after the *Great Britain* was raised, we found that not over two-thirds of the water was exhausted from them. This demonstrates beyond the possibility of doubt that we had an abundance of power to elevate the *Great Britain* entirely above the water, and had we been allowed to drive the pumps but one hour more this would have easily been accomplished. It is established that the power of the Dock can be applied with safety, as it has frequently been done by exhausting all the water from some one of the sections, and immersing the end floats for the purpose of straightening ships and steamers.

In consequence of not being allowed to raise the dock above the water the pumps were entirely submerged, and, as the valves are not tight, the water slowly ran into the tanks through the pumps.

This made it necessary to start the pumps for a few minutes, two or three times a day during the time she was on the dock. After the propeller was prepared, the ship was lowered and put to float in 30 minutes.

During the time the ship was on the dock we repeatedly requested permission to raise her entirely above the water, but it was not granted.

In proof of the above statement, we annex letters received from Richard Irvin, Esq., and Captain Hesken, and leave it with an intelligent public to judge of our ability to raise entirely this ship, or any other that could be placed on the dock, of not over 2500 tons weight.

To our friends we tender our sincere thanks for their countenance and the patronage bestowed upon us, and hope to meet a continuance of their favors.

In respect to those whom rival interests have made enemies, and whom the triumphant success of our dock in this and many other instances has embittered with envy and malice, and who are ever ready to slander our establishment in private, and assert the gross-est falsehoods about us, in public advertisements and newspaper communications, we do not intend to take any farther notice of any thing they may say or publish on the subject, as the dock has now been in operation about 5 years, and successfully raised between 1500 and 1600 vessels of almost all classes, many of them the largest packet ships and steamers, and its reputation is too well established to be disturbed or injured by any thing they may do or say. We will venture to express the hope that they may hereafter, as citizens of this city, be proud that New-York has a dock capable of raising the *Great Britain*.

Published by order of the

NEW-YORK FLOATING DRY DOCK COMPANY.

OFFICE OF THE N. Y. FLOATING DRY DOCK CO. }
 NEW-YORK, Oct. 21, 1845. }

Gentlemen—I take the liberty of addressing you in behalf of the New-York Floating Dry Dock Co., upon whose dock the steamboat *Great Britain* is now raised sufficiently high to admit of repairing her

propeller, to solicit you to allow us to take her entirely out of the water. It is true that nearly three-fourths of her weight is now upheld by the dock, but as there is ample power in the dock to sustain the remainder, and elevate her wholly high and dry, our company are desirous of availing themselves of this occasion to exhibit the capacity of their dock, and show its ability to raise the largest class of ships. They are the more anxious to make this demonstration of the power of the dock, from the fact that some doubt has been expressed whether their plan of Dry Dock could be safely extended so as to raise the largest class of ships of war, and as the entire elevation of the Great Britain will tend to overcome, if not wholly to remove such doubt, the company wish, on their own account, as well as that of the public, to embrace this opportunity to demonstrate the fallacy of the objection by raising her entirely out of the water.

Very respectfully, your ob't servant,

R. MOODY, Secretary.

To Capt. James Hosken, R. N., and Richard Irvin, Esq., agent of steamer Great Britain.

NEW-YORK, Oct. 25, 1845.

Gents—I enclose a letter from Captain Hosken, which so fully replies to yours of the 21st inst., addressed to him and myself, that I have nothing to add except to express my confidence in your dock, and my entire satisfaction with its performance in the case of the steamer Great Britain.

Yours respectfully,

RICHARD IRVIN.

To the President and Directors of the N. Y. Floating Dry Dock Company.

GREAT BRITAIN STEAMSHIP. }
New-York, 24th Oct., 1845. }

Gentlemen—In reply to your request to raise this ship completely out of water, I have to say, that as there was no necessity on our part for the operation, I felt myself obliged to decline acceding to it. At the same time I must express my entire conviction of the capacity of your dock, to effect your proposition. I may also state to you that I entertained this opinion more than a year since, and made a report to my Directors, that in the event of the emergency arising, your Dock could do it.

The Great Britain displaced about 2300 tons, when placed upon your dock, and was raised $7\frac{1}{2}$ feet in one hour and thirty-seven minutes, without the slightest appearance of strain in any part of her. This left about 700 tons water borne. You subsequently lifted her a little higher at my request, leaving about 600 tons water borne; and then, from my own observation, I have no doubt you had about 800 tons lifting power left.

The power exerted having completely coincided with the calculation you had previously made me acquainted with, and the result agreeing with the known displacement of the ship.

I remain, gentlemen, your ob't servant,

JAMES HOSKEN.

To the President and Directors of the New-York Floating Dry Dock Company.

DRY DOCK—NEW-YORK HARBOR.

REPORT

OF

THE SECRETARY OF THE NAVY,

RELATIVE TO

The construction of a Dry Dock in New-York harbor, upon the plan of using, as an elevating power, the water of the Croton aqueduct, &c.

FEBRUARY 19, 1844.

Read, and referred to the Committee on Naval Affairs.

NAVY DEPARTMENT, February 12, 1844.

Sir—In obedience to the requirements of an act of the Congress of the United States, passed March 3, 1843, in these words :

“ And the Secretary of the Navy is hereby directed to cause an examination to be made of the expediency, practicability, and probable expense, of constructing a dry dock in the harbor of New-York, upon the plan of using, as an elevating power, the water of the Croton aqueduct, and of sufficient capacity to rebuild or repair a 74-gun ship ; and to cause an examination of any other plan or plans of a dry dock, or floating dock, in said harbor, deemed worthy by the Secretary to be reported upon ; and to report the result of such examination, with his opinion thereon, to the next session of Congress :”—

The Secretary of the Navy has the honor to report that, in October last, the engineer of the Bureau of Yards and Docks, Wm. P. S. Sanger, Esq. was directed to make the necessary examinations of sites for the proposed Croton-water dock. He was assisted in his arduous labors by Messrs. George F. De la Roche and Calvin Brown, scientific engineers and draughtsmen, employed in the civil department of the naval service.

Three sites were examined within the limits of the city of New-York, with reference to the use of the Croton water as an elevating power.

The first was at Bellevue, on the alms-house lot.

Though this site contains room enough for a dock, it is not sufficiently spacious for a navy-yard, and has the further objection of flats or shoals in front, which would prevent the access of the largest ships of war ; and the bed of the river at this point being rock, covered only by a thin deposit of mud, excavation, for the purpose of deepening the channel, would be impracticable ; and the site is not considered suitable. The plan of this site accompanies Mr. Sanger's report, marked No. 1.

Doc. No. 146.

The second point examined was at Kip's Bay. Here a depth of water is found sufficient to float the largest ships at all times of the tide, and the site is beyond any injurious influence from the currents caused by the waters flowing through Hellgate. It is also sufficiently near to the central parts of the city to obtain readily workmen and materials. The grounds about this site, however, are very irregular; and the grading for a navy yard, and the rock excavations for a dock, would be very expensive. Plan No. 2, accompanying Mr. Sanger's report, exhibits the form and features of this site. Plan No 3, represents the arrangement of the dock.

Harlaem cove, at the mouth of the Harlaem river, and opposite to the south end of Great Barn island, was next examined. This site is shown on plan No. 4, of Mr. Sanger. The larger portion of the ground being a low marsh covered with water at ordinary high tides, and the mud being some twenty feet deep, would require great expense in filling and in piling for solid foundations.

The estimated cost of a dock at this site is \$1,716,996.

There would be great danger in approaching this point with ships, owing to the rapid currents in and about Hellgate. This site was examined by a commissioner in 1836, and reported as unfavorable, which opinion is confirmed by Mr. Sanger.

It will be perceived, from the report of the engineers, that it is practicable to construct a dry dock in New-York, upon the plan of using the Croton water as an elevating power. The expenses of such a work for one dock at Kip's bay (the only point examined, where it is considered safe to construct the work) is estimated at \$1,580,835, exclusive of the cost of land, and of the water to be obtained from the Croton reservoir, of the amount of which no reliable estimates could be procured. The expediency of constructing such a work remains to be considered.

One of the principal advantages of a lock-dock over the excavated dock, where the tides do not drain the excavated dock at their ebb, was formerly considered to be their easy drainage; but, since the introduction of pumps driven by steam-power, this advantage has become of minor importance, and the cost of procuring the Croton water, it is believed, would exceed the expense of draining by steam. A lock-dock would, undoubtedly, be dryer than an excavated dock, which must always be more or less wet, from the constant oozing in of the tide.

Another advantage resulting from the elevated and dry position of lock-docks, is, that houses can be erected over them, and the ships be thus kept from the action of the water and the weather at the same time. But these advantages, it is believed, may be obtained in a more effective and cheaper mode, by a plan which will be spoken of in another part of this report.

The expense of a lock-dock at Kip's bay, or at any other point, would be very large, and, without a navy-yard connected with it, the advantages would be limited. To connect with it a navy-yard, would require the erection of workshops, ship-houses, storehouses, and machinery, indispensable in such an establishment; and it would also supercede and render useless the like kind of works, which have been built at the Brooklyn yard at a cost of more than a million of dollars.

Doc. No. 146.

After a careful examination of the several reports made at different times by the commissioners and engineers who have had the subject of a new location for a navy-yard on the waters of New-York confided to them, and deliberate consideration of the different points discussed and explained in those reports, the conclusion seems forced upon the mind that it is inexpedient to change the location of the navy-yard at Brooklyn, and that the Croton water cannot be beneficially used as an elevating power for a dry dock.

The Secretary of the Navy was directed, in the said resolve, to cause an examination of any other plan or plans of a dry dock, or floating dock, in said harbor, deemed worthy by the Secretary to be reported upon, and to report the result of such examination, with his opinion thereon, to the next session of Congress.

There have been two such plans of docks examined ; first, the ordinary excavated stone dock, similar to those of Charlestown and Norfolk ; and the sectional floating dock.

In the early history of the navy, the repairs and examinations in bottoms of ships were made by heaving the ship down—a process both costly and hazardous. Early efforts were made by the Government to introduce the use of the dry dock, both for repairs and shelter. In a report of the Secretary of the Navy, in December, 1798, it is said : “ Docks will be highly necessary in repairing our ships, to avoid the tedious, expensive, and sometimes dangerous operation of heaving down. They can, undoubtedly, be made in eastern States, where the tides rise very considerably—probably in New Hampshire, Massachusetts, and Rhode Island. Whether they can be made with equal advantage, or to answer valuable purposes, to the southward of Rhode Island or New-York, I cannot form an accurate judgment from any information I possess ; though it would unquestionably be a great public advantage to have a dock at the entrance into the Chesapeake bay, and another still further south, if circumstances will permit.

In President Jefferson's message of December 15, 1802, speaking of the same subject, he says : “ Presuming it will be deemed expedient to expend annually a convenient sum towards providing the naval force which our situation may require, I cannot but recommend that the first appropriations for that purpose may go to the saving what we already possess. No cares, no attentions can preserve vessels from rapid decay, which lie in water, exposed to the sun. These decays require great and constant repairs, and will consume, if continued, a great portion of the moneys destined to naval purposes. To avoid this waste of our resources, it is proposed to add to our navy-yard here a dock, within which our present vessels may be laid up dry, and under cover from the sun. Under these circumstances, experience proves that works of wood will remain scarcely at all affected by time. The great abundance of running water which this situation possesses, at heights far above the level of the tide, if employed as is practised for lock navigation, furnishes the means for raising and laying up our vessels on a dry and sheltered bed ; and should the measure be found useful here, similar depositories for laying up, as well as for building and repairing vessels, may hereafter be undertaken at other yards offering the same means.”

Doc. No. 146.

Before the introduction of steam-power for the purpose of drainage, it was deemed important to place a dock where the ebb and flow of the tide were sufficient to float a ship into the dock, and drain it by the same natural power; or to place the ship by lockage so high, that the dock would be drained by opening its sluice-ways. Since the introduction of steam-power excavated docks are kept tolerably well drained at a cheap rate, even where their beds are below the surface of the water, by pumping.

The general advantages of docking, over the old mode of heaving down, consist in the safety to the ship, and facility to the workmen in examining and repairing ships' bottoms; in economy of time and expense; and in the opportunity it affords of a more thorough examination of the defective parts.

The first dock in the United States was built in Charlestown, and is capable of docking the largest ships. The estimated cost, as stated in the report of engineer Loammi Baldwin, Esq., was \$280,089; the actual cost was \$677,089. The cost of the dock at Norfolk was \$962,459. Both these are stone docks.

No detailed estimate of the cost of constructing a dry dock at the Brooklyn yard has come under the notice of the undersigned. Mr. Baldwin, in his report to the department, dated December 10, 1836, says upon this subject:

"The cost of a dry dock, I have learned from experience, is wholly out of your reach by the ordinary calculations of detail. * *

"The closest calculations can never be so safe, for your present purposes, as that of taking the mean cost of the two docks, already built at Boston and Norfolk.

The dry dock at Boston, including all expenses, cost	\$677,089	78
The dry dock at Norfolk, including all expenses	962,459	19
	<hr/>	<hr/>
	1,639,548	97
	<hr/>	<hr/>
Mean cost	819,774	48

* * * * *

"Hence I cannot assume safer data, that I, or any other engineer, I believe, can furnish, than \$820,000, for the cost of a dry dock at either site in question."

This estimate is exclusive of the excavation of the channel, and crib-work, to secure a suitable depth of water at the Brooklyn yard.

Mr. Sanger estimates the cost for the like work, for the dock, \$750,000, and the crib-work at \$100,000; but it does not appear, in his report, that this sum is derived from any estimate of the details of cost.

Excavated stone docks, in this country, where the tides do not rise many feet, have but partially met the wants of the ship builders. Besides, they are costly, confined for room, dark, and damp. They do, indeed, answer for single ships; but the ship-building interest (one of the most important branches of human industry, viewed in all its bearings, upon the welfare of the human family) has long needed, and labored to discover some plan by which vessels could be built on level ways, and thence launched into their destined element, without the racking and straining

Doc. No. 146.

always incident to the ordinary mode of building and launching from inclined planes; a plan that would likewise enable them safely to raise vessels vertically from the water, and place them high and dry, for repairs or preservation. It is true, a vessel can be thus built and launched from the excavated stone dock; but such a dock is entirely too expensive to be used for such a purpose, and such a length of time as would be required to build a large ship.

Various inventions have been essayed for the purpose of reaching so desirable a result; and floating docks, on different models, have been built, and successfully used, for a number of years, in raising, repairing, and launching merchant vessels, and the smaller vessels of war. No attempt has been made to build ships on the floating docks; they have been used only to raise and repair them. There was still a want unsupplied—a plan by which vessels, when thus raised, could be safely transferred to dry land and housed, a plan by which vessels could be built, standing vertically, and thus launched—avoiding the liabilities of strain, hogging, and warping, incident to the building and launching from the inclined ways. This desirable and important object, long so fruitlessly sought, it is believed has been attained by the invention of the sectional floating dock, connected with a permanent basin and level rail track. Vessels of the largest size may be raised from the water, on this dock, used as the elevating power; the dock floated into its basin, settled on its permanent foundation, and the ship thence transferred to the land, and again safely placed upon the dock, and lowered into the water, never losing its upright position.

S. D. Dakin, Esq., of New-York, has presented a plan of this dock, and exhibited a working model of it, to the department; which seems to promise the accomplishment of the great object so long sought in the business of ship building.

The dock here spoken of—not connected with the proposed improvement of a permanent basin and railway—has been in successful operation for several years in New-York; and has raised, and had repaired on it, numerous vessels, some of large size and great length, without having experienced any accident, either to the ships or the dock.

A personal examination of the sectional dock and its working power in raising and lowering a vessel of more than 600 tons, made by the undersigned, at New-York, during the last season, proved to him very satisfactory and conclusive in favor of the utility of the invention.

The proprietors claim that this dock possesses the following advantages:

“1st. A perfect adaptation of the supporting power of the dock to the actual shape of the vessel's bottom.”

This is a great practical advantage, understood more fully by shipwrights than by other persons. They all agree in saying that artificial methods of adjusting keel blocks in a rigid line to the shape of the keel, however plausible in theory, do not work well in practice; and that nothing hitherto devised can compare, in this respect, with the sectional buoyant platforms of this dock, which are themselves buoyed up by the very pressure of the water that sustains the vessel when afloat; and each

Doc. No. 146.

acting independent of the rest, though all in concert, must necessarily hold her in her floating shape.

"2d. Abundance of room, light, and air, around the vessel's bottom."

The advantage in this respect is so great, that shipwrights unite in declaring that it enables them to perform their work from 15 to 20 per cent. cheaper on this, than on any other dock, and to inspect the minutest damages or defects of the vessel's bottom.

"3d. Ability of being elongated or contracted, according to the length of the vessel, and of being separated, by taking the sections apart, into two or more docks, and thus performing a great deal more efficient service than any other dock.

4th. The facility with which it can be repaired, by raising one section at a time, on two others.

"5th. The short time required for its construction—not being more than 8 or 10 months.

"6th. Its entire independence of the tides—being capable of operating at all tides.

"7th. The small expense of working it, depending upon the size of the vessels; whereas, in a stone dock, the smaller the vessel, the more the expense.

"8th. Its ability to sink without ballast; and, in sinking or rising, to maintain its equilibrium, and any required position, by means of its moveable and controlling end floats.

"9th. Its adaptation, attained by its sectional arrangements, to make timber and iron exert their strength in the most effective and economical manner, and secure the structure against the risk of an overwhelming strain bearing upon any one point. Each section is, indeed, with a limited lifting power, to which its strength is adapted, acting independently, and yielding in the water if any pressure beyond that amount tends to come upon it.

"10th. Ability to be easily moved from place to place—an advantage at all times of much convenience, and, in case of an anticipated attack on the navy-yard, of the greatest moment."

Such are the advantages claimed for this dock, independent of any connection with a permanent platform and rail-track.

The engineer, Mr. Sanger, was directed to examine the Brooklyn yard, in reference to the practicability of using this dock and rail-track at that yard.

His report to the department, herewith transmitted, presents a detail of facts connected with the subject. A dock capable of lifting the ship *Pennsylvania*, of 120 guns, weighing, when ready for sea, 5,200 tons, with permanent basin, bed-way, rail track, and all the necessary machinery to work it, can be built for \$497,000, and requires forty feet of water to raise her.

The cost of dredging and crib-work, to accommodate this structure, at the Brooklyn yard, would be about the same as would be required if a stone dock were built there. The cost of a sectional dock, with all the above-named appendages, sufficient to raise the *Pennsylvania*, relieved of the weight of her armament and stores (weighing, in that state, 2,876

Doc. No. 146.

tons,) would cost \$485,000, and require 32 feet water to raise the ship, and but 14 feet to float her in, and bed her on the permanent basin.

A dock to lift a second class frigate, with dock machinery and one rail-track, complete, can be built for \$180,000.

An excavated stone dock can accommodate, ordinarily, but one vessel at a time, and, during war, would hardly afford the facilities that would be needed. The Navy Commissioners, in a report dated February 17, 1836, state that it might require 12,000 days' labor to repair the bottom of a 74—working in the longest days of the summer. In such a case, many weeks, if not months, must elapse before such a vessel could be taken from the dock, owing to the comparatively small number of persons who could work upon her at once in so confined a place.

The sectional floating-dock, with rail-tracks, could accommodate many vessels at once, where they would be placed with ample room, light, and air around them, and giving every facility for working with despatch.

The object so strongly desired in Mr. Jefferson's message, before quoted—that our vessels may be laid up dry, and under cover from the sun, and which he hoped to obtain by means of lock-docks—it is believed may be much better, and much more cheaply obtained, by the sectional dock and railway.

All experience verifies the remark of Mr. Jefferson, that “no cares, no attentions can preserve vessels from rapid decay, which lie in water, exposed to the sun,” and that works of wood, laid up dry, will remain scarcely affected by time.

Some of the most costly ships of our navy have rotted, and been broken up, seeing little more service than lying at the wharves; while others, built about the same periods, remain comparatively uninjured, in the houses in which they were built.

It is believed that the sectional dock and railways will not only answer for the repairs of ships, better than any other plan yet devised, but that they will become the only building-ways; and that, instead of letting our ships, when not in use, lie and decay at the navy-yards, in ordinary, they will be raised from the water, and placed under cover, protected from the weather, upon the rail-tracks.

The plan of the sectional dock and railway commends itself to favor by its cheapness and simplicity; and if, on trial, it realizes what has been promised from its use, it will enable the Government to construct, at a moderate cost, a dock at each of the navy-yards, capable of accommodating a number of ships at once.

After carefully considering the facts, statements, and opinions which have been presented to the department, at different periods, by the officers and others who have had the subject of a dry-dock at the Brooklyn yard under investigation, the undersigned is fully persuaded that the plan of dock of Mr. Dakin, here spoken of, is worthy of trial on a scale sufficiently large for raising the largest ships.

A copy of a letter from Foster Rhodes, Esq., the naval constructor at Norfolk, is appended, as likewise the report of Mr. Sanger.

All of which is respectfully submitted:

DAVID HENSHAW,

Hon. JOHN W. JONES,

Speaker of the House of Representatives.

Doc. No. 146.

GOSPORT, VA., *January 22, 1844.*

DEAR SIR: I received on Saturday your letter and pamphlet—"Plan and Advantages of a Sectional Dry Dock," &c., for which please accept my thanks.

The lithograph enables me fully to comprehend the important improvements you have therein delineated. The mode by which you propose to take the vessel from the dock to the land, for the purpose of repair or safe keeping, and again to put her in the water, is much more simple and effective than anything that I suggested last winter to Mr. Bayard, the intelligent chairman of the Committee on Naval Affairs in the Senate.

In examining the plan, and reading your letter, I cannot but feel flattered in seeing my recommendation to Messrs. Dakin and Burgess, of having the centre tank in one, and the truss or frame enclosed within it, for additional strength, so fully carried out. With regard to a location, I do not think any place equal to the Brooklyn yard for naval purposes, (if a floating dock is to be adopted,) where a basin may be dug with the greatest ease, either in the meadows, or in the flat in front of the yard, where there is abundant room for piers, slips, &c.

In looking over your whole plan, it may be termed a magnificent one, truly; and although it may be drawn out too far for the navy of the present day, it is on a principle that can be extended as the wants of the service may require it.

The principles, details, and practicability of the plan of the dock, basin, platforms, &c., are highly creditable to the intelligence, industry, and practical knowledge of yourself and your associates.

Very respectfully, your obedient servant,

FOSTER RHODES.

R. MOODY, Esq., *Washington, D. C.*

REPORT OF THE CHIEF ENGINEER OF THE BUREAU OF YARDS AND DOCKS.

WASHINGTON, *January 23, 1844.*

SIR: In compliance with your order of the 30th October last, directing an examination of several points on the East river, in the harbor of New York, in reference to the construction of a dry dock, using the water of the Croton aqueduct as an elevating power, &c., I have performed the duty assigned, and respectfully report:

Here follow the views of Mr. Sanger, which are omitted, in regard to the proposed Croton water Dock, the construction of which he declares to be "inexpedient."

My letter of instructions also directs me "to examine the Brooklyn Navy-Yard, and ascertain the practicability and cost of constructing a floating sectional dock upon Dakin's plan, connected with a railway to take the ships from the dock to the land—the dock and railway to be capable of taking up the largest ships-of-the-line."

Doc. No. 146.

This subject has engaged my particular attention, and I had several opportunities of witnessing the performance of a dock on this plan, which is in daily operation. This dock consists of seven sections, two of which were completed and first used in December 1840; in January, 1841, the third section was added; in July and August, 1841, the fourth and fifth were added; in March, 1842, the sixth was constructed; and in August, 1842, the dock was extended to its present capacity. No accident has yet occurred to this dock, and a statement of the number and description of vessels which have been raised and repaired will afford the best evidence of its safety and utility. The proprietors exhibited their register, by which it appears that the following vessels have been taken out and repaired: 1 sloop of war, 87 ships, 53 barques, 139 brigs, 132 schooners, 17 sloops, 27 pilot boats, and 59 steamboats. Among the steamboats were several of great length and weight. I was present when the Troy, 295 feet length, was taken out; and made particular observations to ascertain if the boat was strained by the operation. A line of horizontal brackets was placed at intervals of about 12 feet along the centre of the deck; and after the boat was entirely out of the water, no change whatever could be discovered in the line. This afforded satisfactory evidence that the form of the boat was preserved. This dock is a very simple and ingenious contrivance, and its construction and arrangements reflect much credit on the projectors. The lifting power of the dock now in use is 2,140 tons.

The proprietors propose to construct a dock, basin, and three railways, of the following dimensions and powers, for the sum annexed: The extreme breadth of dock 120 feet, and length sufficient to accommodate the *Pennsylvania*; to be divided into 6 sections, each to consist of 1 submerged tank, divided in the centre by a strong partition, and 2 end floats; the external dimensions of the tanks to be 86 feet long, 30 feet wide, and 9 feet 6 inches deep; the external capacity equal to 80 feet length, 26 feet width, and 8 feet depth; the external dimensions of the end floats to be each 25 feet 6 inches long, 16 feet wide, and 9 feet deep; the depth to be immersed by the power of machinery 6 feet. These dimensions will furnish a lifting power in each tank equal to 532.45 tons, and in each float a power equal to 78.33 tons. There being two floats in each tank, the lifting power to each section will be equal to 689.11 tons, and the 6 sections will be 4,134.66 tons. The depth of tanks, 9 feet 6 inches, added to the height of keel-blocks, 2 feet 6 inches, will give for the requisite depth of water, over and above the draught of the ship, 12 feet: thus, to dock a ship of 25 feet draught will require 38 feet depth of water. The weight of the ship *Pennsylvania*, with her armament, stores, and crew, is stated at 5,200 tons, and a dock of lifting power sufficient to raise this weight, would require an additional depth of 2 feet in the tanks, and 40 feet water for use. The several sections of this dock are to be connected by strong beams of oak timber, and they may be arranged to accommodate a vessel of any length from thirty feet to three hundred. On each side of the dock is a strong framing, upon which are placed the steam-engines and machinery for pumping the water from the tanks, and for forcing the floats beneath the water. The proposed basin is to be 250 feet square, and the side walls 11 feet high: the whole area of the basin to be strongly

Doc. No. 146.

piled, and covered with a stone floor 1 foot thick : the piles to be 12 inches diameter, and 4 feet from centre to centre ; and all the masonry of the floor and side-walls to be laid in hydraulic cement. The estimate is for three railways, each provided with an hydraulic cylinder of sufficient power to draw on shore the largest ships-of-the-line ; also, two steam-engines, each of the power of twenty horses, and provided with all the necessary pumps and fixtures for working the engines and cylinders, one set of bed and sliding-ways, and three sets of hauling beams ; the foundations of the railways to be piled ; the piles cut off two feet below ordinary high water, and capped with timbers 12 inches thick ; the walls to be 2 feet 6 inches wide at the base, and 2 feet at the top for the side-walls ; the centre-walls to be 3 feet at the base, and 2 feet 6 inches at the top ; and all the walls to be connected by strong cross-walls.

The process of docking a ship is first to sink the dock to the required depth, by admitting water into the tanks, and elevating the floats by the small engines and machinery ; the ship is then placed directly over the centre of the dock, the side-shores arranged, and the pumps are then set in motion. As the water is withdrawn from the tanks, they gradually rise to the surface, and, with them, the ship. As the ship rises from the water, the end floats are forced down, and secure the stability of the whole structure, while they aid in elevating the ship. After the ship is raised upon the dock, the whole structure is to be floated into the basin, the water again admitted into the tanks, and the dock sunk until it securely rests upon the floor of the basin, a cradle is then to be placed beneath the ship, the hauling beams attached, the engines and cylinders put in operation, and the ship drawn on shore upon the railways.

The connecting beams are so constructed, that, by keying them firmly after the ship is raised, the several sections become as one structure ; and should one end of a tank be filled with water by accident or design, that tank could not sink below the others, it being supported by the connecting beams ; the effect of such accident would be, the depression of the side of the dock upon which the tank filled, until the additional displacement became equal to the amount of water admitted into the tank ; this effect would be immediately counteracted by driving the end floats into the water or by exhausting more water from the remaining tanks. The machinery for working the pumps and end-floats is perfectly simple, and the connection of one section with another is accomplished by means of a hollow sliding shaft, with ball and socket joints ; the introduction of the ball and socket joints, and moveable shafts, renders it unnecessary to preserve a straight line of shafting, and affords a great facility for extending the sections to any desired length. The power necessary to force an end-float beneath the water is 78.33 tons, and no additional resistance would ever be applied to the machinery used in forcing these floats down. The common lifting pump, with butterfly valves, is used for exhausting the tanks ; and I apprehend no difficulty in constructing all the machinery with sufficient strength to guard against accidents. The pump-work is a small item of expense, and the cost of a duplicate set would be a very inconsiderable amount.

By introducing gauge-rods, properly graduated, the lifting power exerted by each section may be ascertained with mathematical precision ; the

Doc. No. 146.

weight of ships placed upon the docks may thus be readily and accurately obtained. The sections of this dock may be disconnected at pleasure, and formed into two docks of three sections each, or one of four, and the other of two sections, and, if required, may be merged into three docks of two sections each. Such small docks would be capable of taking out brigs or schooners, and could be used independently of each other. The practicability of constructing an hydraulic cylinder of power sufficient to draw the ship from the dock upon a level railway, does not admit of a reasonable doubt, when it is well known that large ships are not only drawn up on an inclined plane, by the methods usually adopted upon the common marine railway, but are also raised vertically from the water, by means of hydraulic cylinders, as applied at the screw-docks. A serious objection, alike common to all plans of floating docks when extended to a capacity sufficient to raise the largest ships-of-the-line under all circumstances, is the great depth of water necessary for their operations. The weight of the Pennsylvania, when ready for sea, is stated to be 5,200 tons, and her draught of water 25 feet. Should it be necessary to dock this ship in such condition, a depth of at least 40 feet would be required. To obtain this great depth at the Brooklyn yard, it will be necessary to perform a large amount of dredging; and to preserve it, there should be a line of crib-work constructed around the wall, about the flats. A line of crib-work 800 feet long, and of proper dimensions and construction, will cost \$39,200, and the excavations around the yard will cost the additional sum of \$111,158. The proprietors propose to construct a dock, basin, and all the necessary machinery as already described, the dock being capable of raising 5,200 tons, for the following sums:

For the dock, basin, railways, and all machinery	\$497,000 00
For 800 running feet of crib-work	39,200 00
For excavating the channel	111,158 00
	<hr/>
	\$647,358 00
	<hr/>

The following statement will show the weight and draught of a vessel of each class when in ballast trim.

Names of Vessels.	Weight of hull and ballast.	Mean draught.
	Tons.	Feet.
Pennsylvania	2,876	17.5
North Carolina	2,268	17
Franklin	1,836	16
Congress	1,455	15.33
Macedonian	1,033	14.83
Saratoga	536	11.83
Vandalia	491	11.53
Yorktown	412	11.41
Dolphin	140	8.95

Doc. No. 146.

A dock of lifting power sufficient to raise the largest ship when relieved from the weight of her armament, stores, &c., would require for its operation a depth of water equal to 14 feet in addition to the draught of the ship. Thus, to dock the *Pennsylvania*, the requisite depth would be 32 feet; and the cost of a dock, basin, three railways, and all the necessary machinery, would be \$485,000 00
 For 800 running feet of crib-work 39,200 00
 For excavating the channel 43,158 60

\$567,358 60

I am of the opinion that the construction of a dock upon this plan, capable of raising the largest ships-of-the-line, would be practicable.

In the performance of the duty assigned me, I have availed myself of all the information to be obtained from the reports of former examinations in relation to the location of dry docks and navy-yards. These surveys and examinations have been attended with much labor and exposure; and I cannot forbear an expression of the great satisfaction I experienced from the prompt and efficient manner in which the several duties were performed by Messrs. George F. De la Roche and Calvin Brown, the gentlemen associated with me.

Very respectfully, your obedient servant,

WM. P. S. SANGER, *Engineer.*

Hon. DAVID HENSHAW,

Secretary of the Navy.

28th CONGRESS,
1st Session.

(SENATE.)

(134)

REPORT OF THE SECRETARY OF THE NAVY,

COMMUNICATING

(In compliance with a resolution of the Senate)

Plans and estimates for the construction of a dry dock at Pensacola.

NAVY DEPARTMENT, *February 16, 1844.*

SIR: In Compliance with the direction of the Senate to lay before that body "the plan and estimate for a permanent wharf at Pensacola navy yard, as designed by James Herron, civil engineer, and approved by the naval commandant of the station," &c., the Secretary of the Navy has the honor to submit copies of Mr. Herron's plans and estimates.

In obedience to the second part of said resolution, the Secretary has the honor to transmit the report of W. P. S. Sanger, Esq., engineer of the bureau of Yards and Docks, in favor of the plan of Dakin's sectional dock, connected with a basin and railway, as affording more extensive facilities than any other plan with which he is acquainted.

The estimate of the probable cost is embraced in the offers of S. D. Dakin and associates to construct it, hereto appended.

They offer, first, to construct a dock 115 by 165 feet, piled in the best manner, with timber bottom, covered with concrete, and timber walls, covered with galvanized iron, and one rail track, machinery for dock complete, for \$179,100.

A dock and basin of the same size, built of hewn stone, in the most permanent manner, with one rail track, for \$255,600.

Or, third, to construct the same dock, with a basin to admit six rail tracks, or 175 feet square, of hewn stone, for \$315,600.

The department has recently, in another report submitted to Congress, expressed an opinion in favor of Dakin's plan of dock, connected with rail tracks. This plan is believed to be eminently well adapted to the locality of Pensacola, and will undoubtedly afford facilities greatly superior to any excavated stone dock that can be constructed. The department decided some time since to adopt the plan of Mr. Dakin for the dock at Pensacola, directed to be built under an appropriation of Congress of \$100,000, for building a floating dock at that place, and partly contracted for the same, but deferred completing the contract, that the improvement of the rail track might be added, and because the appropriation was not sufficient to meet the expense of the dock on the improved plan.

I have the honor to be, very respectfully, your obedient servant,

DAVID HENSHAW.

Hon. W. P. MANGUM,

President of the Senate.

BUREAU OF YARDS AND DOCKS, *February 15, 1844.*

SIR: In answer to your communication of this date, calling for a "report of my opinion of the plan of a dock, marine railway, or other suitable work, (without specifications,) that will afford the greatest facilities for the construction and thorough repair of vessels of war of the size of second-class frigates, at the Pensacola navy-yard," I respectfully report that, in my opinion, the plan of Dakin's sectional dock, connected with a basin and railways for taking ships on shore, affords more extensive facilities than any other plan with which I am acquainted.

Very respectfully, your obedient servant,

WILLIAM P. S. SANGER, *Engineer.*

Hon. DAVID HENSHAW,

Secretary of the Navy.



